REMARKS

The Office Action dated March 30, 2006 has been carefully considered. Claim 1 has been amended to conform the wording to that of the dependent claims. Claims 21-23 are also amended, as supported on p. 8, lines 24-28. Claims 1-23 are in this application.

The Examiner stated in the Office Action at page 4 that "there does not appear to be any criticality in selecting the North Atlantic fish or cold water seaweed species now specified in the independent claims. Absent evidence demonstrating an unexpected result for using North Atlantic fish species such as herring or cod exclusively, or cold water seaweed, or sulfur from a geothermal source, etc., applicant is seen as having done nothing more than what would have been prima facie obvious from the prior art." Applicant disagrees with the conclusion of lack of criticality, as discussed below.

The claimed process of preparing the instant composition uses a step of fermenting fish harvested from cold waters of the North Atlantic. A second fermentation is performed in a blend with Icelandic seaweed and geothermal water high in sulfur and minerals (p. 5, lines 30-31). By targeting fish from the North Atlantic (pelagic fish such as capelin, herring and menhaden), and progressing the fermentation in high sulfur geothermal water, the fermentation product becomes enriched in the slightly acidified amino acids proline, glutamic acid, and arginine (p. 4, lines 17-19), phenolics, and an increased sulfur content of the water (p. 6, lines 28-33). The high content of soluble acidified amino acids induces the proline pathway in plants, which is critical to development of valuable agronomic traits (p. 3, lines 18-20). The acidified amino acids are key organic stimulators of the stress modulating proline-linked pentose phosphate pathway and they also stimulate soil-conditioning micro-organisms. Furthermore the fermented product contains small fatty acids that are anti-microbial against acid-intolerant bacterial pathogens (p.6, line 33 to p. 7, line 4). The compositions also contain natural plant growth promoting substances including, cytokinins, auxins, proline, glutamic acid and arginine which improve growth and yield (p. 3, lines 25-29). The cold tolerant seaweed, due to cold stress, is rich in proline, phenolics, stress modulators from the proline pathway and cytokinins. The cytokinins stimulate shoot growth (p. 5, lines 11-20). The phenolics and aromatic compounds improve the flavor and

aroma of crops (p. 9, lines 4-7).

It is clear from the above description, that the present invention utilizes an inventive method of processing cold tolerant fish along with cold tolerant seaweed in a high sulfur-containing aqueous medium so as to extract, in higher percentages than for non-cold-stressed species, and preserve substances important to improving agronomic traits in plants. The resulting composition is useful and unobvious.

35 U.S.C. § 103

The previously presented claims were rejected under 35 U.S.C. § 103 as obvious in view of the combined teachings of U.S. Patent No. 4,383,845 to Rutherford, U.S. Patent No. 5,906,941 to Shetty, U.S. Patent No. 5,876,479 to Hedgpeth, IV, Tatterson et al. "Fish Silage", J. Sci. Fd. Agric, 25:369-379, 1974 and the newly cited reference, U.S. Pat. Appl. Pub. 2004/0156920 to Kane.

Applicant traverses the rejection and asserts that the combined teachings of the cited references do not teach or suggest all the limitations of the invention defined by the present claims, do not motivate the ordinary artisan to combine the teachings, and do not lead to an expectation of success upon combining the teachings.

Claims 1-13 teach a method of preparing an organic composition for enhancing valuable agronomic traits in plants which comprises, as a second step in the process, adding homogenized seaweed with geothermal water enriched in sulfur to SFPH so that at least about 1% but less than about 20% of the volume is a cold tolerant seaweed enriched in proline. Claims 14-17 and 21-23 teach the composition.

Notably, Rutherford **teaches away** from the present invention, so that one skilled in the art of the invention upon combining the teachings of Rutherford with other information known in the art would not arrive at the present invention. Rutherford teaches to make liquid seaweed the major proportion of the composition, teaching away from compositions that are high in fish hydrolysate as a proportion of the composition (Col. 1, lines 41-62). Rutherford teaches that high fish hydrolysate-type compositions, while providing more of the major nutrients, provide fewer trace elements which Rutherford prefers in the composition, and which Rutherford teaches

is provided when seaweed is the major proportion of the composition. Further, Rutherford teaches that high fish hydrolysate-type compositions only provide minimal growth during times of plant stress, growing at a very low rate. Rutherford teaches that, in contrast, a high-in-seaweed type composition aids during times of plant stress, acting as a catalyst to increase nitrogen, potassium and phosphorus absorption (Col. 1, lines 41-62). Thus, when considering solutions for the problem of plant growth during stress, Rutherford motivates the skilled artisan to create compositions that have high proportions of seaweed extract and low proportions of fish hydrolysate. In contrast, the present invention teaches an alternative solution to stress. The present invention teaches that by utilizing seaweed species that are cold-tolerant in the formulation, these species have natural stress modulators from the proline pathway (page 5, lines 19-20). The present invention claims that the seaweed component is less than 20% of the volume. Thus Rutherford **teaches away** from the present invention.

In light of the Rutherford teaching, upon attempting to combine the teachings of Rutherford with the teachings of the other cited references, it would not be obvious to the ordinary artisan to create a composition wherein homogenized seaweed with geothermal water enriched in sulfur is added so that at least 1% but less than 20% of the volume is a cold tolerant seaweed.

Rutherford teaches away from the claimed invention in yet another respect. Claims 1-13 teach the method of preparing an organic composition for enhancing valuable agronomic traits in plants which comprises, prior to the addition of seaweed, a step of fermenting cold-water fish to produce a soluble fish protein hydrolysate enriched in proline. The fermenting step preferably comprises adding acid to enhance the fermenting (claims 2-3).

Rutherford is cited for teaching a foliar growth-promoting mixture comprising a liquid seaweed component in combination with a fish emulsion mixture. What was not considered is that Rutherford teaches that the fish emulsion mixture is prepared by introducing an *alkaline* composition into a pressure vessel with the fish solids and steam pressurizing it (col. 5, lines 17-34). Thus Rutherford teaches a process for producing fish emulsion that would lead the ordinary artisan in the opposite direction of the claimed method, i.e., alkaline conditions rather than acidic

conditions for processing the fish. For this reason, Rutherford **teaches away** from the claimed method of fermenting fish with added acid.

Furthermore, since Rutherford teaches that fish emulsion is prepared as an alkaline rather than an acidic preparation, it could not be obvious to the ordinary artisan that the soluble fish protein hydolysate prepared according to the method of the invention, would have the same advantages as Rutherford's composition. Without the expectation of success, the claimed invention would not be obvious.

Shetty is cited for teaching that soluble fish protein hydrolysate was known as a nutrient source for plant tissue culture. Shetty does not contain information on how the SFPH was made, since it was obtained as a purchased product (col. 7, lines 50-65). Thus the combination of Shetty with Rutherford does not help to create an obvious guideline for the ordinary artisan to have reached the present invention where the SFPH is prepared under acidic conditions. Furthermore, Shetty merely teaches that SFPH serves as a source of nutrients in tissue culture medium (abstract). The types of problems that are overcome by this culture medium are control of vitrification, assistance in acclimation to the atmosphere outside the tissue culture environment and enhancing somatic embryogenesis (col. 1, lines 44-58). It could not be obvious to the ordinary artisan in the field of the invention, whether a composition with those attributes would be successful in enhancing valuable agronomic traits in plants, since, by definition, agronomy involves soil management and crop production, a widely disparate field from tissue culture. (Webster's II New College Dictionary, 3rd Ed., 2005). Without the expectation of success of Shetty's composition in the agronomy arena, the claimed invention would not be obvious.

Hedgepeth, IV, was cited for teaching a plant fertilizer or soil enhancer composition comprising humic acid, citric acid, seaweed and a source of crude protein such as fish protein. The fish protein that Hedgepeth, IV, teaches is not the SFPH of the claimed invention. Hedgepeth, IV, teaches a composition containing hydrolyzed proteins from feather meal, blood meal and fish meal (Table 1 of Hedgepeth, IV and col. 4, lines 5-10). Thus, Hedgepeth, IV, does not add any further instructions toward the method of preparing a composition including fermenting fish to produce SFPH. In fact Hedgepeth, IV, teaches that the hydrolyzed protein

should contain, as major components, all three of feather meal, dried blood meal and fish meal (col. 3, lines 12-15). Thus, there could be no expectation of success as to whether a composition that contains only protein hydrolysate from fermented fish, but not feather meal and blood meal would work as a soil enhancer or fertilizer in the manner of the Hedgepeth, IV composition. Thus, without the expectation of success, the present invention would not be obvious to the ordinary artisan in the field of the invention.

Tatterson et al. was cited for teaching the process for making fish silage including an acid addition step and for using cod and haddock as fish varieties in the fish silage. The problem with this reference, is that it has nothing to do with producing plant fertilizers or soil enhancers, so it provides no suggestion that fish silage prepared in this manner would be useful as a component of a composition for enhancing valuable agronomic traits in plants. Thus, the Tatterson et al. teaching provides no expectation of success if the teaching of the fish silage were combined with the other teachings. This invention, therefore, would not be obvious to the ordinary artisan.

The teaching of Tatterson et al., in combination with Hedgepeth, would actually lead the ordinary artisan in a direction diverse from that of the claimed invention. Tatterson et al teach about the fish silage in the context of using it as an animal feeding stuff (p. 369, Introduction). Furthermore, Tatterson et al. teach that fish silage is valuable mainly for its content of high quality protein and other substances influencing growth. On this subject, Tatterson et al. states that since the protein content of fish silage averages about 15%, its value as a feeding stuff is likely about one quarter to one fifth that of fish meal. Thus, Tatterson et al. would motivate one skilled in the art, desiring to supply protein to a composition to use fish meal. Indeed, upon reading the teaching of Tatterson et al., together with the teaching of Hedgepeth, IV, which teaches making a soil enhancer using fish meal as one source of protein (col. 4, lines 5-10), one skilled in the art, would be motivated to use fish meal rather than the SFPH of the invention in making a product to enhance plant productivity.

Since Rutherford or Hedgepeth, IV do not teach the required limitation for fermenting fish from cold waters to produce SFPH enriched in proline, the combination of either of these with the Kane teaching, does not overcome that defect since Kane merely teaches about herbal extracts that are useful in agricultural compositions.

Furthermore Kane teaches to use oil extracts from plants in the useful compositions. The herbal extracts of the present composition are water extracted (p. 8, lines 24-33). This provides for obtaining the hot water extractable phenolic antioxidants. Thus, Kane **teaches away** from the present invention.

From the above discussion it is clear that the cited references, considered as a whole, do not teach a method of preparing a composition that enhances valuable agronomic traits including the step of fermenting fish to produce SFPH enriched in proline, preferably by adding an acid to enhance the initial fermentation of the fish and followed by another step of adding homogenized seaweed in geothermal water to produce about 1% but less than about 20% of the volume as a cold tolerant seaweed species rich in proline. Therefore the invention would not be obvious to the ordinary artisan at the time of the invention.

In view of the foregoing, Applicants submit that all pending claims are in condition for allowance and request that all claims be allowed. The Examiner is invited to contact the undersigned should he believe that this would expedite prosecution of this application. It is believed that no fee is required. The Commissioner is authorized to charge any deficiency or credit any overpayment to Deposit Account No. 13-2165.

Respectfully submitted,

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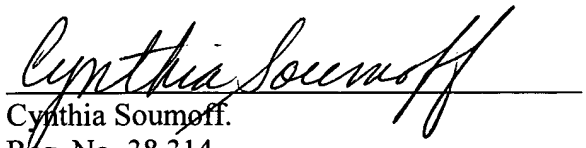

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